ICMPC_2018

Recent trends in laser assisted machining of ceramic materials

S. R. Banik\textsuperscript{a}, N. Kalita\textsuperscript{b}, K. K. Gajrani\textsuperscript{c}, R. Kumar\textsuperscript{c}, M. R. Sankar\textsuperscript{c,*}

\textsuperscript{a}Department of Mechanical Engineering, National Institute of Technology, Silchar, Silchar-788010, India
\textsuperscript{b}Department of Mechanical Engineering, Royal School of Engineering and Technology, Guwahati, Guwahati-781035, India
\textsuperscript{c}Department of Mechanical Engineering, Indian Institute of Technology, Guwahati, Guwahati-781039, India

Abstract

Machining of ceramics is difficult by conventional processes due to their hard and brittle nature as well as high costs involved. To overcome these disadvantages laser assisted machining (LAM) technique has been proposed. LAM has many advantages over conventional machining processes. LAM involves the use of a concentric beam of laser to heat and soften the work-piece thereby reducing its yield strength and increasing ease of machinability. With the progress of technology, numerous experiments involving LAM of ceramics have been performed and the effects of different machining parameters have been studied. In recent times, there have been various developments in laser technology, tools used and mechanisms of machining. This paper is intended to provide the elaborate literature review on the studies undergoing in LAM of ceramics and their comparison with conventional machining processes.

© 2018 Elsevier Ltd. All rights reserved.
Selection and/or Peer-review under responsibility of Materials Processing and characterization.

Keywords: Laser assisted machining (LAM); laser; ceramics; tool life; surface temperature.

1. Introduction

With the advancement of technology, there has been a tremendous growth in utilization of ceramics in manufacturing processes. Ceramics are known to have high strength, hardness, fracture toughness and wear resistance [1, 2]. Due to these properties, ceramics have huge applications in automobile and aviation industries [3, 4]. Because of their hardness and high tensile strength, they are very difficult to machine using simple and

* Corresponding author. Tel.: +91-361-2582684
E-mail address: evmrs@iitg.ernet.in

2214-7853 © 2018 Elsevier Ltd. All rights reserved.
Selection and/or Peer-review under responsibility of Materials Processing and characterization.